



Process, Assessment, Outcome (PAO) Workshop Application

The Montana Office of Public Instruction's (OPI) Assessment Division, is bringing together a group of science educators to review high-quality aligned assessment items and identify cohesive item sets and instructional strategies to meet the Montana Science Standards. Montana adopted new science standards in September of 2016 and they align with the Next Generation Science Standards (NGSS). As teachers make the transition to instruction aligned to NGSS, formative assessment will be an essential tool to ensure that instruction meets student need.

Through using assessments in this formative way teachers will have instruction that is guided by, and responsive to, information they have about their students. The product(s) of this workshop will be to provide elementary and secondary educators with access to high-quality items, item sets, and instructional strategies teachers can use to dig deeper into the standards.

Deadline extended: This form closes on Monday, April 24th at 9:00 am.

1. Name (First and Last Name):
2. Preferred Email:
3. Phone:
4. Present or most recent employer: For example: school name, organization, etc.
5. School City: If you are not currently teaching, indicate the city you live in.
6. Present or most recent teaching assignment: For example: I taught high school biology in a rural class A school.
7. Please tell us your highest degree attained, any endorsements you have, and the core concentration of your education.

8. Do you have any specialized training or expertise? (e.g., IEFA, LEP, ESL, SWD, etc.)

9. Please indicate the subjects you have taught and how many years of experience you have in each.

	Years 0 - 1	Years 1.1 - 5	Years 5.1 - 10	Years 10.1-15	Years 15 +	Pre-service training only.	None.
Elementary science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Astronomy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chemistry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computer science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
General Biology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earth Science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engineering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Geology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Biological Science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Physical Science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Earth Science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Please indicate the grades you have taught and how many years of experience you have in each.

	Years 0 - 1	Years 1.1 - 5	Years 5.1 - 10	Years 10.1-15	Years 15 +	Pre-service training only.	None.
Early childhood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kindergarten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grade 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grade 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grade 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grade 4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grade 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grades 6 - 8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grades 9-10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grades 11- 12	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Undergraduate level	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Graduate level	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. What activities, professional development, and/or trainings have you participated in that involve the Next Generation Science Standards (NGSS), the Framework for K – 12 Science Education, and/or Montana Science Standards (2016).

12. Select your degree of comfort with using and/or navigating Next Generation Science Standards (NGSS), the Framework for K – 12 Science Education, and/or Montana Science Standards (2016):

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1- Novice – very comfortable.	2	3	4	5-Highly familiar – very comfortable.

13. Please rate yourself in the following areas by checking the appropriate level for each skill:

	3 = Strong Skills. Extensive experience in this area.	2 = Moderate Skills. Some experience in this area.	1 = Novice. Limited experience in this area.
Collaboration: Working with Others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical thinking and Problem-Solving	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adaptability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessing and Analyzing Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Initiative and Perseverance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitation Skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication Skills (Verbal and Written)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. For this workshop, what area are you interested in evaluating?

- ☐ Elementary Science (K-2)
- ☐ Elementary Science (3-5)
- ☐ MS-Life Science
- ☐ MS-Earth and Space Science
- ☐ MS-Physical Science
- ☐ HS-Life Science
- ☐ HS-Earth and Space Science
- ☐ HS-Physical Science

15. If selected for this workshop, select your future interests in Montana Science Standard work:

- ☐ I'm interested in being a teacher leader (e.g., school, district, and statewide).
- ☐ I'm interested in developing online content for the Teacher Learning Hub.
- ☐ I'm interested in developing items for Montana's statewide summative science assessment.
- ☐ I'm interested in reviewing items for Montana's statewide summative science assessment.
- ☐ I'm interested in submitting my own assessments (formative and interim) for statewide use.
- ☐ I'm interested in being involved in anything related to science at the state.
- ☐ I'm not interested in any other activities at this time.

16. If selected, please describe how your participation in this work will continue to serve your career interests and professional growth.

17. If selected, what are some ways (after the workshop) you plan to use this experience in your practice and/or share this experience with others.

Deconstruct - Align - Apply

For Questions 1 – 15, please use A Framework for K – 12 Science Education or <http://nextgenscience.org>. You may download a free PDF of the A Framework for K – 12 Science Education at <https://www.nap.edu/catalog/13165/a-framework-for-k-12-science-education-practices-crosscutting-concepts>.

The below item may be outside your expertise but use the supports provided to deconstruct the item. Selected participants will be matched with their content area and expertise. For more information about the item, please visit: <http://nces.ed.gov/nationsreportcard/itmlsx/portal.aspx?type=display&questionlist=2009-12S9:15&index=1&tab=ques>
Using your knowledge about the item, please answer the following questions.

Question refers to the following experiment.

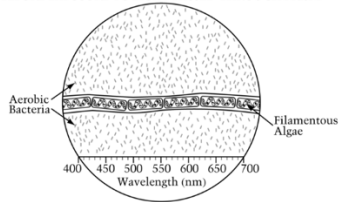
An experiment was conducted to determine which wavelengths of visible light are most effective for photosynthesis. The units shown here are in nanometers (nm).

Two organisms were used: filamentous algae, which are capable of photosynthesis, and some aerobic bacteria, which are not capable of photosynthesis.

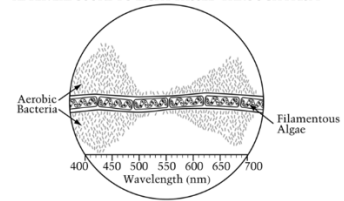
Both organisms were suspended in a water droplet and placed on a microscope slide. The slide was exposed to light that was passed through a crystal prism. (The prism was used to separate visible light into its wavelengths.)

The diagram below illustrates what was seen on the microscope slide before and one hour after exposure to light that was passed through the prism.

BEFORE EXPOSURE TO LIGHT PASSED THROUGH PRISM

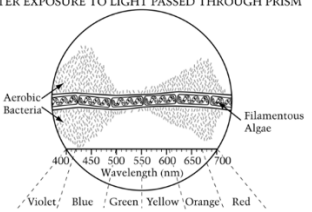


AFTER EXPOSURE TO LIGHT PASSED THROUGH PRISM



The diagram below illustrates what was seen on the microscope slide one hour after exposure to light that was passed through a prism. The colors associated with the wavelengths of light are also indicated.

AFTER EXPOSURE TO LIGHT PASSED THROUGH PRISM



Based on the results of the experiment, a student concludes that the scientist used algae that was green.

Do you agree with the student's conclusion?

A. Yes
B. No

Refer to the results from the experiment to support your answer.

1. What grade-band is most applicable to this item? Please select the best option.

- ☐ Grades K-2
- ☐ Grades 3-5
- ☐ Grades MS (i.e., 6-8)
- ☐ Grades HS (i.e., 9-12)

2. Identify the Disciplinary Core Ideas students must understand. Select all relevant concepts. (Description of Disciplinary Core Ideas on Framework pages 103 – 214). NGSS at:

<http://nextgenscience.org/sites/default/files/resource/files/Appendix%20E%20-%20Progressions%20within%20NGSS%20-%20052213.pdf>

- ☐ PS1: Matter and its interactions
- ☐ PS2: Motion and stability: Forces and interactions
- ☐ PS3: Energy
- ☐ PS4: Waves and their applications in technologies for information transfer
- ☐ LS1: From molecules to organisms: Structures and processes
- ☐ LS2: Ecosystems: Interactions, energy, and dynamics
- ☐ LS3: Heredity: Inheritance and variation of traits
- ☐ LS4: Biological evolution: Unity and diversity
- ☐ ESS1: Earth's place in the universe
- ☐ ESS2: Earth's systems
- ☐ ESS3: Earth and human activity
- ☐ ETS1: Engineering design
- ☐ ETS2: Links among engineering, technology, science, and society

3. Identify the Crosscutting Concepts students must understand. Select all relevant concepts. (Description of Crosscutting Concepts on Framework page 84). NGSS at:

<http://nextgenscience.org/sites/default/files/resource/files/Appendix%20G%20-%20Crosscutting%20Concepts%20FINAL%20edited%204.10.13.pdf>

- ☐ Patterns
- ☐ Cause and effect: Mechanism and explanation
- ☐ Scale, proportion, and quantity
- ☐ Systems and system models
- ☐ Energy and matter: Flows, cycles, and conservation
- ☐ Structure and function
- ☐ Stability and change

4. Identify the Science and Engineering Practices students must use. Select all relevant practices. (Description of Practices on Framework pages 50 – 53). NGSS at:
<http://nextgenscience.org/sites/default/files/resource/files/Appendix%20F%20%20Science%20and%20Engineering%20Practices%20in%20the%20NGSS%20-%20FINAL%20060513.pdf>

- ☐ Asking questions (for science) and defining problems (for engineering)
- ☐ Developing and using models
- ☐ Planning and carrying out investigations
- ☐ Analyzing and interpreting data
- ☐ Using mathematics and computational thinking
- ☐ Constructing explanations (for science) and designing solutions (for engineering)
- ☐ Engaging in argument from evidence
- ☐ Obtaining, evaluating, and communicating information

5. Identify the corresponding Montana Performance Standard for this item.
(e.g., NGSS Performance Expectation, K-2-ETS1).

6. What is the focus or skills being emphasized by this item? Identify an NGSS Evidence Statement from <http://nextgenscience.org/evidence-statements> that provides observable features of student knowledge and skill(s). Provide one claim statement for this item below:

7. Select the degree of alignment to the Montana Performance Standard. How well does this item “fit” the Montana Performance Standard? Please select the best option.

- ☐ **Full alignment.** This question clearly belongs in this standard.
- ☐ **Strong partial alignment.** This item may belong in this standard; however, there is one or more aspects of the item that does not fit well.
- ☐ **Weak partial alignment.** There is some overlap with the standard but it is a stretch and we cannot find a better standard.
- ☐ **No alignment.**

8. Must your 3-Dimensional selection match exactly the Montana Performance Standard/NGSS performance expectation in order to be aligned? Explain your thinking about item alignment.

9. Cognitive Rigor. What is the Depth of Knowledge (DOK) for this item? Please select the best option. Resource at:
<https://drive.google.com/file/d/0B34l3UA3OHHnLU80UWhNLW83YWM/view?usp=sharing>

- ☐ Level 1-Recall
- ☐ Level 2- Skills & Concepts/ Basic Reasoning
- ☐ Level 3- Strategic Thinking/ Complex Reasoning
- ☐ Level 4- Extended Thinking

10. Cognitive Rigor. What is the Bloom's Taxonomy for this item? Please select the best option. Resource at:
<https://drive.google.com/file/d/0B34l3UA3OHHnLU80UWhNLW83YWM/view?usp=sharing>

- ☐ Remember (Level 1)
- ☐ Understand (Level 2)
- ☐ Apply (Level 3)
- ☐ Analyze (Level 4)
- ☐ Evaluate (Level 5)
- ☐ Create (Level 6)

11. Explain if there is any connection to Montana's Math Standards and/or the math practices. If a connection exists, identify what content and/or skills are being reinforced. Math practice resource located at:
<http://nstahosted.org/pdfs/ngss/PracticesVennDiagram.pdf>
(e.g., the mathematical practice "reason abstractly and quantitatively", etc.).

12. Explain if there is any connection to Montana's English Language Arts Standards and/or the ELA student capacities. If a connection exists, identify what content and/or skills are being reinforced. Student capacities resource located at:
<http://nstahosted.org/pdfs/ngss/PracticesVennDiagram.pdf>
(e.g., "engage in argument from evidence", etc.)

13. Describe a formative assessment and/or strategy that can be used with students to ensure their understanding of this standard (e.g., pre/post-tests, exit slips, student-generated test questions, one minute summary, etc.)

14. Describe how this item may be developed to include or how it already includes an authentic learning experience for students (e.g., cultural significance, place-based, etc.)

15. How could this item or topic be modified to meet the needs of multiple learning styles and/or abilities? (e.g., heterogeneous grouping, think-pair-share, KWL charts, etc.)

Thank you for your interest in this summer workshop!

**Application screening begins April 10th & selections will be made by April 21st.
We will inform all applicants of our participant decisions after April 21st.**